UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

100424

SUBJECT: Standard Chlorine: Final Feasibility Study Report **DATE:** 7-20-93

FROM: Robert S. Davis, Coordinator (3HW13)
Biological Technical Assistance Group

TO: Kate Lose, RPM (3HW42)

The BTAG has reviewed the subject document and offers the following comments for your use, on behalf of NOAA, FWS and EPA BTAG members.

The following comments represent the National Oceanic and Atmospheric Administration (NOAA) review:

The remedial goals for ground water and surface water may provide protection for NOAA trust resources, although uncertainty exists because of the limited toxicity database for chlorobenzenes.

Soils/sediment response levels were chosen to represent a contaminant concentration above which remedial action may be required. The risk-based response level for on-site surface soils was 625 mg/kg of total chlorinated benzenes (TCBs). The Lowest Observed Effects Level (LOEL) for soil flora, 33 mg/kg, was used as a response level for ecological receptors in off-site soils and sediments. This LOEL was calculated from the results of lettuce seed toxicity tests conducted during the RI. The response level for off-site sediments is high compared to the Apparent Effects Threshold (AET) concentrations for 1,2,4-trichlorobenzene, which range from 0.032 to 0.064 mg/kg.

Remedial goals were previously established for ground water and surface water at concentrations uncertain to provide protection for NOAA trust resources. Modifications to these remedial goals were made in the Final Feasibility Study and are summarized in Table 2-5. The remedial action guidelines for numerous compounds were increased substantially to concentrations well above those known to cause detrimental effects to aquatic resources.

Some changes were made to remedial alternatives 2,3,4, and 5. Although alternatives 3,4, and 5 still provide the greatest protection to trust resources, the remedial action objectives continue only to be met to varying degrees. Because the response level (33 mg/kg TCBs) used for sediment remediation is high compared to the AET concentration for 1,2,4-TCB, the remedial action objectives may not be protective of aquatic resources. None of the proposed remedial alternatives presented in the Final Feasibility Study include extensive remediation of the sediments from Red Lion Creek.

Delaware River resources are currently restricted from access to Red Lion Creek because of the tide gate. However, contaminated storm water may discharge into the river, in which case the remedial alternatives may not protect these resources. Even if this discharge is not contaminated, aquatic resources downstream from the tide gate may be at risk from potentially contaminated sediments (no analyses have been conducted), or from future transport of contaminated sediments downstream during high flow conditions. Also the tide gate should not be viewed as a protective barrier to keep environmental resources from contaminated areas.

Extensive sampling has been conducted in Red Lion Creek immediately downstream from the Standard Chlorine site, and the extent of contamination has been well defined in that area. However, only limited sampling of sediments has been conducted between Route 9 and the tide gate, and no sampling has been conducted downstream from the tide gate. Further studies should be conducted to determine extent of contamination downstream of Route 9 including the Delaware River.

Previous concerns regarding the methods and conclusions of the ecological risk assessment have been identified. These concerns still need to be addressed for an adequate assessment of the risk posed to environmental receptors, including NOAA trust resources. Remedial alternatives could subsequently be developed for sediments in Red Lion Creek based upon conclusions from the risk assessment.

No new information was presented in the Final Feasibility Study regarding the determination of risk-based response levels. The site-specific sediment toxicity tests conducted to help in determining target cleanup concentrations for the protection of aquatic resources, remain suspect. Results of these tests with Hyallela azteca indicate that 33 mg/kg TCBs be employed as the response level for ecological receptors in off-site soils and sediments. These results, along with the previous concerns, suggest that the response level for sediments of 33 mg/kg TCBs may not be protective of aquatic resources.

As previously identified, an adequate evaluation and discussion of potential impacts from site-related contaminants to aquatic receptors and their supporting habitats remains absent from the site investigation.

The U.S. Fish & Wildlife Service provided the following comments:

BTAG comments provided in a memorandum dated 4-14-93 on the preliminary FS do not appear to have been considered. The specific concerns center around the uncertainties associated with the response level of 33 mg/kg total chlorinated benzenes (FS, page 2-33). The FWS Service concurs with BTAG's conclusion that 33 mg/kg may not be protective of aquatic resources. At the least, there may be large uncertainties associated with this value.

The response level of 33 mg/kg was selected because it was the LOEL from the lettuce seed germination test, as described in the Remedial Investigation (RI) report. This was lower than the LOEL for either the Hyalella (135.7 mg/kg) or the earthworm test (485 mg/kg). There are discrepancies, however, in the RI report on the concentration of the sediment sample SSC-20-B which was used for the Hyalella test. It was reported as 543 mg/kg in RI Table 6-95, which was

the basis for the calculation of the LOEL of 135.7 mg/kg (the lowest concentration with adverse effects was a 25% dilution with clean sediment). In RI Table 2-8, however, the TCBs concentration of this sample is listed as 469 mg/kg. Also in RI Table 2-8, a sample at the same location (SSC-20) was reported to have a TCB concentration of 33 mg/kg. It is unclear whether this was a split sample or a replicate grab. The variability between the two samples suggests that there is either considerable heterogeneity at this location or that the analysis of the TCBs concentration is highly uncertain. An additional test with site sediments indicated that there was reduced survival in a sediment sample that contained only 1.7 mg/kg of TCBs.

The Service does not accept the statement on FS page 1-25 that there is no indication of any potential for adverse effects to occur in great blue heron. It was unable to reproduce the calculations for the great blue heron provided in the RI. The RI text is confusing in that the term PD, which is in the exposure equations for fish ingestion and water ingestion (RI Tables 6-82 and 6-85, respectively) is not defined. The following two statements on page 6-185 appear to be in conflict. "Nevertheless it was conservatively assumed that one-third of the heron diet would be obtained from Red Lion Creek in the site vicinity. It was conservatively assumed that 30% of a heron's total diet would be obtained from Red Lion Creek in the vicinity of the Standard Chlorine site." In the equation for fish ingestion dose, only the value of 0.30 for the fraction ingested within site vicinity is defined.

The RI refers to section 6.2 as the source of the fish data to be used in the ingestion estimate, but does not identify the actual value that was used. Depending on whether the mean value for sunfish, the value for catfish, or the mean of the catfish and sunfish values is used, the fish ingestion dose is either 8.6×10^{-4}, 4.5×10^{-3}, or 2.6×10^{-3} mg/kg/day. The Service cannot determine which fish concentration value was used in the RI to estimate a fish ingestion dose of 1.5×10^{-3} mg/kg/day.

The Service cannot replicate the surface water ingestion intakes. For example, for chlorobenzene a daily intake of 3.12×10^{-6} mg/kg/day was estimated in Tables 6-83 and 6-84. The arithmetic mean surface water concentration of chlorobenzene from Table 6-5 is 0.064 mg/L and the 95% concentration is 0.120 mg/L. It is, therefore, impossible to estimate the same intake for both the average and 95% exposure case. Using these concentrations in the surface water intake equation (Table 6-85), the Service obtains an estimated intake of 1.7×10^{-3} mg/kg/day for the average case and 3.1×10^{-3} mg/kg/day for the 95% case.

By adding the estimated fish and surface water ingestion, the Service calculates an average exposure for chlorobenzene on the order of 4.3×10^{-3} mg/kg/day, as opposed to the 1.5×10^{-3} mg/kg/day presented in Table 6-83. Recognizing that no toxicity data are available for many of the chlorinated benzenes, the Service recommends reevaluating the ingestion data in terms of TCBs, as was performed in the sensitivity analysis section of the RI. This is analogous to the approach used to estimate sediment risks by summing all of the chlorinated benzene concentrations. Daily intake of TCBs were compared to the critical toxicity value for hexachlorobenzene, which is the only chemical for which toxicity data were identified.

The average fish ingestion dose was recalculated by the Service in terms of TCBs, using data from Table 5-2. TCBs concentrations for catfish and sunfish were 1.4 mg/kg and 0.23 mg/kg, respectively. The average of these two values is 0.815 mg/kg. Using the parameters in Table 6-82, the fish ingestion dose is estimated to be

$$\frac{0.815 \text{ mg/kg} \times 0.3 \text{ kg/day} \times 0.30 \text{ (fraction on-site)}}{3.0 \text{ kg}}$$

or 0.024 mg/kg/day. For surface water, an average TCBs concentration was calculated to be 0.24 mg/L (using data from Table 2-9). Using the parameters in Table 6-85, the average surface water ingestion dose is estimated to be

$$\frac{0.24 \text{ mg/L} \times 0.26 \text{ L} \times 0.30 \text{ (fraction on-site)}}{3.0 \text{ kg}}$$

or 0.006 mg/kg/day. Adding the two routes of exposure, the average daily intake for total chlorinated benzenes is 0.030 mg/kg. If this value is compared with the critical toxicity value of 0.02 mg/kg for hexachlorobenzene, a hazard quotient of 1.5 is obtained.

The Service uses this example to show that the conclusions of the risk assessment for the heron pathway are sensitive to the values and parameters used in the equations. It is highly likely that there are errors in the calculations and that the conclusion that there is little risk to this receptor is not well-supported. It recommends a thorough review and reevaluation of all calculations for the heron pathway.

On the basis of the discrepancies in the data presented in support of the 33 mg/kg response level and its inability to replicate the heron risk assessment, the Service has major concerns with the FS report. It urges the contractor to thoroughly review these two points and incorporate the necessary changes in the FS.

General Conclusions:

The above comments notwithstanding, our discussions with you on Wed., June 30 resulted in the agreement that BTAG members accede to the current cleanup plans. Our agreement is based upon the 33 mg/kg cleanup figure contained in several documents. This agreement is also based upon the commitment to monitor the area beginning the remedial design phase on 1 following. The monitoring should be comprised of two efforts; one devoted to sediment levels of TCBs (using both chemistry and bioassay) and the other to in-situ birds. For the chemistry/bioassay effort, we recommend a grid be established covering the area and specific sampling locations. A draft proposal is being circulated for comment.

Thanks for the opportunity to comment, and if you have any questions contact Bob Davis on X3155. If you want to use these comments directly or edit them into the official letter, I will be glad to discuss any issues that are unclear and even concur on your letter if you wish. In any case, feedback from the RPM is important to the efforts of the BTAG, and I would like to hear from you regarding the usefulness of these comments.